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EXAMINER	
VAN ROY, TOD THOMAS	
ART UNIT	**PAPER NUMBER**
2828	

DATE MAILED: 10/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/616,334	Applicant(s) FISCHER ET AL.	
	Examiner Tod T. Van Roy	Art Unit 2828	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32 and 38-41* is/are pending in the application.

4a) Of the above claim(s) *14-18* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-8,11,13,19,22,25,26,28-30,38,40 and 41* is/are rejected.

7)☒ Claim(s) *3-4,9-10,12,20-21,23-24,27,31-32,39* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The examiner acknowledges the amending of claims 1 and 10, and the addition of claims 40-41.

Claim Objections

The previous objection to claim 10 is withdrawn.

Response to Arguments

Applicant's arguments, see Remarks, filed 08/14/2006, with respect to the rejection(s) of claim(s) 1, 19, 22, and 38 under USC 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art.

The examiner agrees with the applicant that the stated arithmetic mean limitation found in claims 1, 22, and 38 is not met by the Robinson reference.

The examiner additionally agrees that the extinction ratio controller of claim 19 is not found to make adjustments to set a given extinction ratio value.

Please see below for an updated rejection to the claims.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-2, 5-8, 11, 13, 19, 22, 25-26, 29-30, 38, and 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Robinson et al. (US 6891866).

With respect to claim 1, Robinson teaches an integrated circuit couplable to a semiconductor laser (fig.1 #10) and to a photodetector (fig.1 #34), the photodetector optically couplable to the semiconductor laser, the semiconductor laser capable of transmitting an optical signal in response to a modulation current (fig.1 #18), and the photodetector capable of converting the optical signal into a photodetector current (fig.1 Imon), the integrated circuit comprising: a modulator couplable to the semiconductor laser (fig.1 #18), the modulator capable of providing the modulation current to the semiconductor laser, the modulation current corresponding the an input data signal (fig.1 IN_P, IN_N); and an optical midpoint controller couplable to the photodetector and couplable to the semiconductor laser (fig.1 #16), the optical midpoint controller, in response to the photodetector current, capable of adjusting a forward bias current of the semiconductor laser (fig.1 Ibias output from #16), so that the semiconductor laser

generates the optical signal with a power level approximate to a predetermined optical midpoint power level (fig.1 #40, predetermined via comparison to reference value). Robinson further teaches determining three values (A, B, C, respectively); an Ibias + Imod(high), Ibias + Imod(low), and Ibias + Imod/2, the last of which corresponds to the midpoint power level. Robinson does not teach the level to be determined as an arithmetic mean of a plurality of values. It would have been obvious to one of ordinary skill in the art at the time of the invention to eliminate an entire set (Ibias + Imod/2) of measurements from Robinson's method, freeing up operational time and increasing efficiency, and enable the controller (#43, taught to complete basic computations, col.7 lines 56-58) to compute the optical midpoint value from the mean of measured A and B values. *[This method would eliminate a measuring step, while still allowing for the same operation of Robinson's original system. When these measurements are taken the Ibias and Imod values are constant (col.7 lines 28-30). As an example: Ibias = 1, Imod(high) = 1, Imod(low) = 0; A = 2, B = 1, C = 1.5, mean of A and B is equal to 1.5 which is the same as measurement C.]*

With respect to claim 2, Robinson discloses the modulator to be capable of providing a first modulation current level (col.6 lines 40-50, value Imod) to the semiconductor laser when the input data signal has a first logical state (1) and providing a second modulation current level (col.6 lines 50-58, value 0) to the semiconductor laser when the input data signal has a second logical state, the first modulation current level being greater than the second modulation current level; wherein the semiconductor laser is capable of providing the optical signal having a first optical power level in

response to the first modulation current level and having a second optical power level in response to the second modulation current level (col.6 lines 40-58), the first optical power level being greater than the second optical power level; and wherein the photodetector is further capable of generating a first photodetector current level in response to the first optical power level and a second photodetector current level in response to the second optical power level (col.7 lines 23-47).

With respect to claim 5, the optical midpoint controller is capable of sampling the first photodetector current level to form a first photodetector current indicator (col.7 lines 23-30), sampling the second photodetector current level to form a second photodetector current indicator (col.7 lines 31-38), determining a measured optical midpoint power level as an arithmetic mean of the first photodetector current indicator and the second photodetector current indicator (please see claim 1), determining a variance between the measured optical midpoint power level and the predetermined power level (col.4 lines 12-20) and, based on the variance, forming an optical midpoint error signal (difference between Imon and Iref can be thought of as the error signal).

With respect to claims 7-8, Robinson discloses the optical midpoint controller is enabled to sample the first photodetector current level when the input data signal has a predetermine number of consecutive bits (or time) having the first logical state and is enabled to sample the second photodetector current level when the input data signal has a predetermined number of consecutive bits (or time) having the second logical state (from claim 5 we know at least one 0 and one 1 bit must be present, so the

predetermined number of high values is 1 and low values is also 1; and the predetermined time can be the time for a single 1 bit and a single 0 bit).

With respect to claim 11, Robinson discloses the optical midpoint controller is further capable of providing, in response to the optical midpoint error signal, a forward bias current adjustment signal (col.4 lines 12-20, where Iavg is Ibias+Imod/2) to a variable current source (fig.1 #14), and wherein, in response to the forward bias current adjustment signal, the variable current source is capable of adjusting the forward bias current of the semiconductor laser to generate the optical signal having a substantially constant, predetermined optical midpoint power level (done to adjust to the Iref predetermined average power value).

With respect to claim 13, Robinson discloses the optical midpoint power controller as outlined in the rejection to claim 5, and further teaches a sampler coupled to the photodetector (fig.1 #38), the sampler capable of sampling the first photodetector current level to form a first photodetector current indicator (samples and converts to a digital indicator) and sampling the second photodetector current level to form a second photodetector current indicator (samples and converts to a digital indicator).

With respect to claim 19, Robinson discloses an extinction ratio controller (fig.1 #43) couplable to the photodetector and couplable to the modulator (through #16), the extinction ratio controller, in response to the photodetector current, capable of adjusting the modulation current provided by the modulator to the semiconductor laser (col.7-8 lines 20-10, col.8 lines 3-10, extinction ratio measured and recorded, then taught that the Imod and Ibias can be adjusted to a desired power settings for extinction ratio or

otherwise). Robinson does not teach adjusting the power levels to correspond to a predetermined extinction ratio. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine Robinson's taught power level (bias current) adjustment with the predetermined extinction ratios in lookup tables, to allow for adjustment of the power to a known extinction ratio value (can be compared and power adjusted to match predetermined value stored in memory, col.7 lines 8-14, 64-67) which would allow for signal clarity from the transmitting device..

With respect to claim 22, Robinson discloses a method of controlling midpoint power level of a semiconductor laser comprising: modulating the semiconductor laser at a first modulation level when the input data signal has a first logical state and modulating the semiconductor laser at a second modulation level when the input data signal has a second logical state (see rejection to claim 2); transmitting an optical signal having a first optical power level in response to the first modulation level and having a second optical power level in response to the second modulation level, the first power level being greater than the second optical power level (see rejection to claim 2); detecting the first optical power level and the second optical power level (see rejection to claim 2); determining a measured optical midpoint power level (see rejection to claim 5); determining an optical midpoint error as a variance between the measured optical midpoint power level and a predetermined optical midpoint power level (see rejection to claim 5) and; using the optical midpoint error, adjusting the forward bias current of the semiconductor laser to generate the optical signal having substantially the predetermined optical midpoint power level (see rejection to claim 5).

Robinson further teaches determining three values (A, B, C, respectively); an Ibias + Imod(high), Ibias + Imod(low), and Ibias + Imod/2, the last of which corresponds to the midpoint power level. Robinson does not teach the level to be determined as an arithmetic mean of a plurality of values. It would have been obvious to one of ordinary skill in the art at the time of the invention to eliminate an entire set (Ibias + Imod/2) of measurements from Robinson's method, freeing up operational time and increasing efficiency, and enable the controller (#43, taught to complete basic computations, col.7 lines 56-58) to compute the optical midpoint value from the measured A and B values. *[This method would eliminate a measuring step, while still allowing for the same operation of Robinson's original system. When these measurements are taken the Ibias and Imod values are constant (col.7 lines 28-30). As an example: Ibias = 1, Imod(high) = 1, Imod(low) = 0; A = 2, B = 1, C = 1.5, mean of A and B is equal to 1.5 which is the same as measurement C.]*

Claim 25 is rejected for the same reasons outlined in the rejection to claim 2 above.

Claim 28 is rejected for the same reasons outlined in the rejection to claim 5 above.

Claims 29-30 are rejected for the same reasons outlined in the rejections to claims 7-8 above.

With respect to claim 38, Robinson discloses a semiconductor laser capable of transmitting an optical signal having a first power level in response to a first

modulation current level, and having a second optical power level in response to a second modulation current level, the first optical power level being greater than the second optical power level (see rejection to claim 2); a modulator coupled to the semiconductor laser, the modulator capable of providing the first modulation current level to the semiconductor laser when the input data signal has a first logical state and providing the second modulation current level to the semiconductor laser when the input data signal has a second logical state, the first modulation current level being greater than the second modulation current level (see rejection to claim 2); a photodetector optically coupled to the semiconductor laser, the photodetector capable of generating a first photodetector current level in response to the first optical power level and a second photodetector current level in response to the second optical power level (see rejection to claim 2); a sampler coupled to the photodetector, the sampler capable of sampling the first photodetector current level to form a first photodetector current indicator and sampling the second photodetector current level to form a second photodetector current indicator (see rejection to claim 13); a forward bias current controller coupled to the sampler and to the semiconductor laser, the forward bias current controller capable of determining a measured optical midpoint power level; determining a first variance between the measured optical midpoint power level and a predetermined optical midpoint power level, and, based on the first variance, forming an optical midpoint error signal; and in response to the optical midpoint error signal, further capable of adjusting the forward bias current of the semiconductor laser to generate the optical signal having substantially the predetermined optical midpoint power level (see rejection to claim 5);

and a modulation current controller coupled to the sampler and to the modulator, the modulation current controller capable of determining a measured extinction ratio as a ratio of the first photodetector current indicator to the second photodetector current indicator; determining a second variance between the measured extinction ratio and a predetermined extinction ratio and, based on the second variance, forming an extinction ratio error signal, further capable of adjusting the modulation current provided by the modulator to the semiconductor laser to generate.the optical signal having substantially the predetermined extinction ratio (see rejection to claim 19). Robinson further teaches determining three values (A, B, C, respectively); an Ibias + Imod(high), Ibias + Imod(low), and Ibias + Imod/2, the last of which corresponds to the midpoint power level. Robinson does not teach the level to be determined as an arithmetic mean of a plurality of values. It would have been obvious to one of ordinary skill in the art at the time of the invention to eliminate an entire set (Ibias + Imod/2) of measurements from Robinson's method, freeing up operational time and increasing efficiency, and enable the controller (#43, taught to complete basic computations, col.7 lines 56-58) to compute the optical midpoint value from the measured A and B values. *[This method would eliminate a measuring step, while still allowing for the same operation of Robinson's original system. When these measurements are taken the Ibias and Imod values are constant (col.7 lines 28-30). As an example: Ibias = 1, Imod(high) = 1, Imod(low) = 0; A = 2, B = 1, C = 1.5, mean of A and B is equal to 1.5 which is the same as measurement C.]*

With respect to claims 6 and 26, Robinson teaches the integrated circuit and method outlined in the rejection of claims 5 and 25 above, but does not teach the photodetector current levels to be sampled via the respective voltages. Robinson does teach an additional photodetector (fig.1 #274) whose signals are evaluated via the corresponding voltages (col.8 lines 21-34). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the current referenced photodetector signals with the voltage referenced secondary photodetector signals as a matter of engineering design choice.

With respect to claims 40-41, Robinson teaches the integrated circuit including the optical midpoint control using arithmetic mean as outlined in the rejection to claim 1 above.

Allowable Subject Matter

Claims 3-4, 9-10, 12, 20-21, 23-24, 27, 31-32 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 9-10, 20, 23-24, and 31 are believed to be allowable as each of the either midpoint power controller or extinction ratio controller is stated as integrating the error signals with previous error signals to form an integrated error signal, and then adjusting

the appropriate current response based on this integrated error signal, which was not found to be taught in the prior art. The prior art was found to teach generation of individual error signals, and to make adjustments based on each signal, rather than integrating a plurality of error signals together before adjusting the current levels.

Claims 3, 12, 21, 27, 32, and 39 are believed to be allowable as each of the either midpoint power controller or extinction ratio controller is stated as sampling a plurality of first and second photodetector current indicators, finding the mean of each of the plurality of first and second indicators, and then determining an overall mean of these two means to produce an optical midpoint power level or extinction ratio, which was not found to be taught in the prior art. The prior art was found to teach determining the averages of a 1st and a 2nd value, or an overall average value, but was not found to compute individual means for a plurality of 1st and 2nd values before producing the final averaged value.

Claim 4 is allowable as it depends directly from allowable claim 3.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR

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